function of theta, utilizing coded algorithm applicable if YTM or if Yield M:

generalized   Theta (θ), such a theta: $\theta = 2 \ln(1+r/2)$, wherein r = YTM or Yield M;

means sending said yield, and its derivatives, data set to data storage or digital output;

means computing factorization for change in price over time, comprising algorithm:

$$\Delta P = A + B + C + D$$

wherein,
> $\Delta P =$ change in bid price, for given changes in yield and time,
> A = -abs(Duration) $\times$ Price(dirty) $\times$ ΔY
> B = ½ $\times$ Convexity $\times$ Price(dirty) $\times$ $(\Delta Y)^2$
> C = Theta $\times$ Price(dirty) $\times$ Δt
> D = -(Δ Accrued Interest, for given Δt),

and wherein,
> Y (YTM), by Formula Yield M, or Yield Md, or
> > YTM by non-summation or by summation form function,
> Duration by Formula K, or by first term Taylor series approximation,
> Convexity by Formula V, or by second term Taylor series approximation,
> Theta (θ), such a theta: $\theta = 2 \ln(1+r/2)$, wherein r = ytm,
> Price (dirty) equal bid price plus accumulated interest,
> Δt is elapsed time between two points whereby estimations are made,
> ΔP rounded to nearest pricing gradient, ΔP occurring Δt;

means sending said computed factorization values to data storage or digital output;

means tabling, charting and rendering said generated data of security or portfolio.

62.   An apparatus, processing data or transactions, an automated arbitrage engine, useful for automated computation and identification of profitable arbitrage differentials, comprising:

means inputting data from storage, from data-stream of an analytic valuation engine, or from real-time data-feed, said data comprising at least security's variables of price and yield;

means computing an arbitrage differential between market yield and governing yield, wherein calculating the magnitude and direction of said differential by uniform procedure;

means computing an arbitrage differential between precise price change and actual, wherein calculating the magnitude and direction of said differential by uniform procedure;

means sorting arbitrage opportunities by profit or loss, or spread or notch premit ns.

63. An integrated computer-based financial information and transaction processing system providing analytic processing, assessment of arbitrage spreads and execution of transactions, useful for automated computation of values and sensitivities, for automated computation of arbitrage differentials, and for real-time processing of transactions based thereon, comprising:

business logic computational engines of two core server-based systems: an analytic valuation engine, to facilitate the computation of governing yield and its derivatives data set and to facilitate the computation of change in price for given change in yield over a p riod of time; and an automated arbitrage engine, to facilitate the computation of arbitrage differentials between governing yield and market y..ld and arbitrage differentials between precise price change and actual notched price change for a given change in yield over a period of time;

real-time financial data-feed, wherein each said core business logic server receiving market pricing data from said data-feed, said data fed to cores for computational processing;

porting connections between core business logic engines and from each said engine to output, rendering and storage devices, such devices comprise printers, terminals and memory;

automated control sequences providing execution of computer-driven transactions;

telecommunications connections between system comprised of engines and external entities, such entities comprise the group of exchanges, broker/dealers, and investment entities;

protective devices, such comprise the group of encryption, gate-keepers and firewalls.

Prepared by David Andrew D'Zmura